Random Walks and Simulation Models

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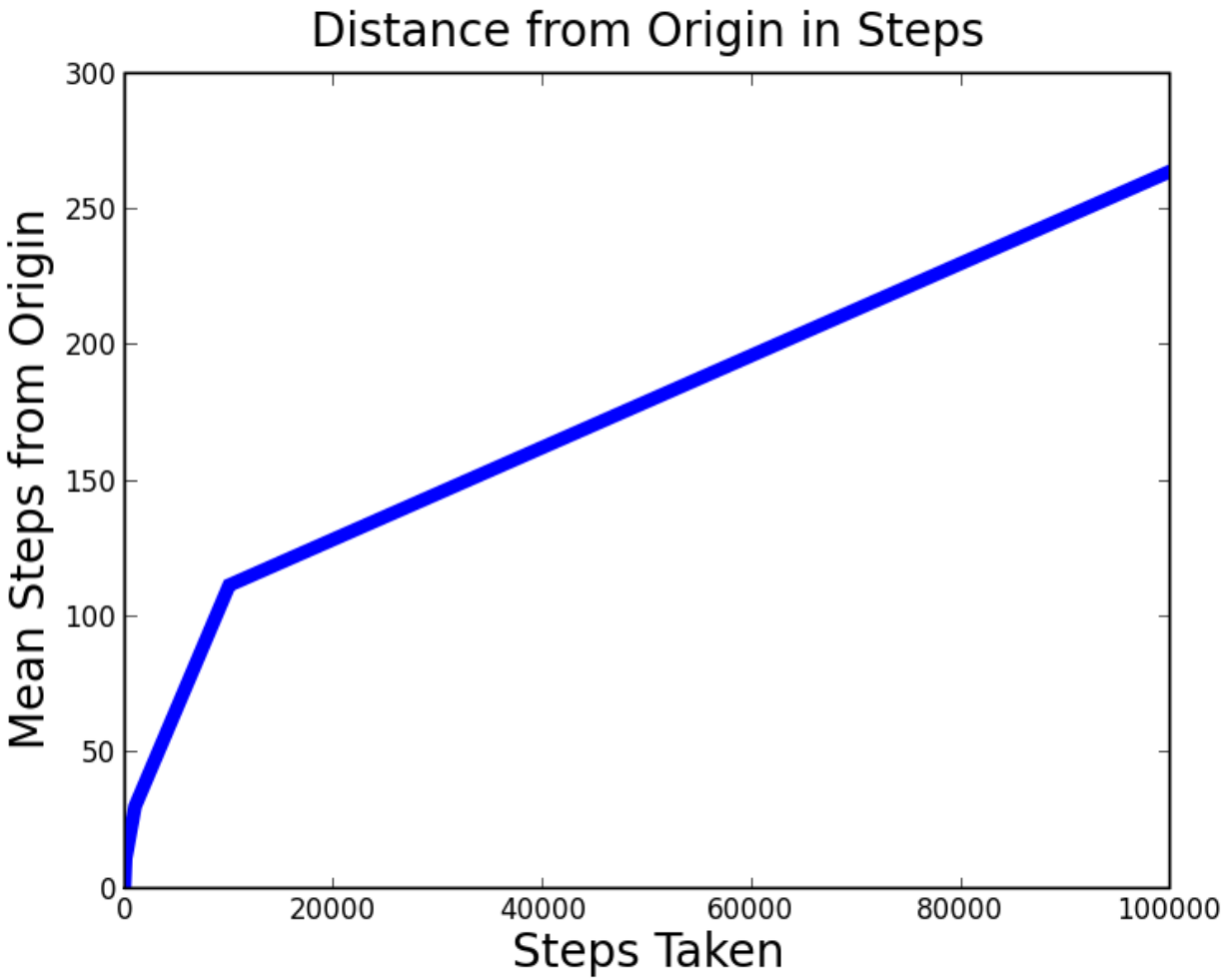
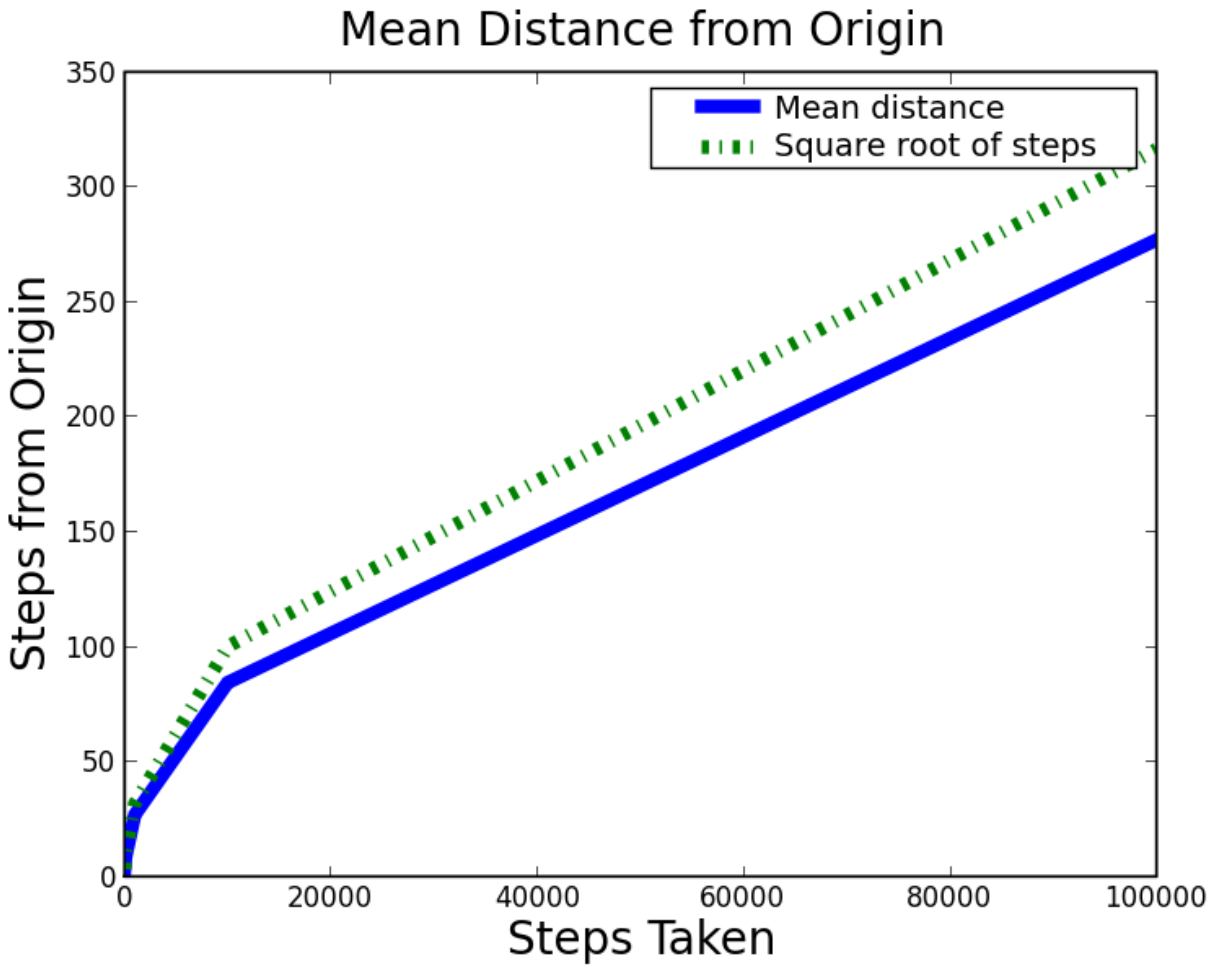
```
import random

def walk(f, d, numSteps):
    start = f.getLoc(d)
    for s in range(numSteps):
        f.moveDrunk(d)
    return(start.distFrom(f.getLoc(d)))
```

```
def simWalks(numSteps, numTrials):
    homer = Drunk('Homer')
    origin = Location(0, 0)
    distances = []
    for t in range(numTrials):
        f = Field()
        f.addDrunk(homer, origin)
        distances.append(walk(f, homer, numTrials))
    return distances
```

```
def drunkTest(numTrials):
    for numSteps in [10, 100, 1000, 10000, 100000]:
        distances = simWalks(numSteps, numTrials)
        print 'Random walk of ' + str(numSteps) + ' steps'
        print '  Mean =', sum(distances)/len(distances)
        print '  Max =', max(distances), 'Min =', min(distances)
```


Distance from Origin in Steps
Mean Steps from Origin
Steps Taken
0
50
100
150
200
250
300
0
20000
40000
60000
80000
100000


Mean Distance from Origin
Mean distance
Square root of steps
Steps from Origin
Steps Taken
0
50
100
150
200
250
300
350
0
20000
40000
60000
80000
100000